Prerequisites

Note 1

621caffff9ce421bb4309fc0c1cf144c

A function is said to be {{c2::multilinear}} if and only if it is {{c1::linear separately in each variable.}}

Note 2

1a514ffb24744a278834d0048496a850

A function is said to be {{c2::bilinear}} if and only if {{c1::it is a multilinear function of two argument.}}

1.1. The notion of Lie algebra

Note 1

686bbc96abfb46e883a4acb108450cc1

At the first place a Lie algebra is {{c1::a vector space L over a field F}}.

Note 2

7a252531934f4c00829418ab1f3a1d01

What is the signature of the new operation in the definition of a Lie algebra?

> $$L \times L \to L.$$

Note 3

a1cc6426fa49471dad192df5295fb310

The operation $L \times L \to L$ from the definition of a Lie algebra is denoted {{c1::$(x, y) \mapsto [xy]$}}.

Note 4

8bb3c76247ab416a97f8f6e247a6c2a2

The operation $(x, y) \mapsto [xy]$ from the definition of a Lie algebra is called {{c1::the bracket or commutator of x and y}}.

Note 5

6c529b4b819a45c3b91755b1280be2a2

How many axioms are there in the definition of a Lie algebra?

> $(L1)$, $(L2)$, $(L3)$.

Note 6

f8d0434e7d3c404b8319bf527f96627c

What is the axiom $(L1)$ from the definition of a lie algebra?

> The bracket operation is bilinear.

Note 7

807fbd0c878541998eb3be30e870652c

What is the axiom $(L2)$ from the definition of a lie algebra?

$[xx] = 0 \quad$ for all $x \in L$.

Note 8

d096a87546b14acfa601179c2ae323e8

What is the axiom $(L3)$ from the definition of a Lie algebra?

$[x[yz]] + [y[zx]] + [z[xy]] = 0 \quad$ for all $x, y, z \in L$.

Note 9

db6289e2261549bcb58877ac4d6f36f7

{{c2::The axiom $(L3)$ from the definition of a Lie algebra}} is called {{c1::the Jacobi identity}}.

Note 10

fdd2c3d3027e4a34be5e9540f148a9cd

Let L, L' be two Lie algebras over F. {{c1::A vector space isomorphism $\phi : L \to L'$ satisfying

$$\phi([xy]) = [\phi(x)\phi(y)] \quad \forall x, y \in L$$

}} is called {{c2::an isomorphism of Lie algebras.}}

Note 11

cbd7fbe2d06c41e29e72d8075fc10e5f

We say that two Lie algebras L, L' over F are {{c2::isomorphic}} if {{c1::there exists a Lie algebra isomorphism $\phi : L \to L'$.}}

Note 12

fe5ab449614b4098a1e81d3d86903d64

Let L be a Lie algebra over F. {{c2::A subspace K of L satisfying

$$[xy] \in K \quad \forall x, y \in K.$$

}} is called {{c1::a subalgebra of L}}